Characterization Of Ladle Furnace Slag From The Carbon

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Statistical Analysis of Methane Concentration Fluctuations Springer
At present, a lot of metallurgical solid wastes have not been timely and effectively recycled, resulting in serious problems of environmental pollution and waste of resources. As a result, large-scale comprehensive utilization technologies have been initiated, including slag dry granulation technology, steel slag cement technology, slag wool technology, slag waste heat recovery technology, etc. The comprehensive utilization of metallurgical solid waste has attracted worldwide attention. It is an effective way to improve the utilization efficiency of resources and the added value of products by using scientific metallurgical solid waste recycling methods. This book intends to provide the reader with a comprehensive overview of metallurgical solid wastes comprehensive utilization technology. The comprehensive utilization methods of four representative metallurgical solid wastes are emphatically described, such as blast furnace slag, steel slag, tailings and metallurgical dust.
Select Proceedings of CPCM 2020 Elsevier
Including papers from the 9th edition of the International Conference on Computational Methods and Experiments in Material and Contact Characterisation this volume presents the work of selected researchers on the subject. Material and contact characterisation is a rapidly advancing field and this volume contains the latest research. Of particular interest to industry and society is the knowledge of surface treatment and contact mechanics of these materials to determine the in-service behaviour of components subject to contact conditions. Modern society requires systems that operate at conditions that use resources effectively. In terms of components durability, the understanding of surface engineering wear frictional and lubrication dynamics has never been so important. Current research is focussed on modification technologies that can increase the surface durability of materials. The characteristics of the system reveal which surface engineering methods should be chosen and as a consequence it is essential to study the combination of surface treatment and contact mechanics. The accurate characterisation of the physical and chemical properties of materials requires the application of both experimental techniques and computer simulation methods in order to gain a correct analysis. A very wide range of materials, starting with metals through polymers and semiconductors to composites, necessitates a whole spectrum of characteristic experimental techniques and research methods. The papers in the book cover a number of topics, including: Computer methods and simulation; Experimental and measurement techniques; Mechanical characterisation and testing; Materials under extreme conditions; Polymers and plastics; Advances in composites; Micro and macro characterisation; Corrosion and erosion; Damage, fatigue and fracture; Recycled materials; Materials and energy; Surface problems and contact mechanics; Surface modification and treatments; Thick and thin coatings; Tribomechanics and wear mechanics; Biomechanical characterisation; Biomechanical applications and Case studies.
Thermodynamic Calculations Versus Instrumental Analysis of Slag-Steel Equilibria in an ASEA-SKF Ladle Furnace Springer
Most of the typical materials employed in today’s constructions present limitations, especially concerning their durability, in either common or severe environmental conditions, and their impact on the environment. In response to these issues, academic and industrial efforts around the world have

been devoted to developing new smart materials that can provide efficient alternatives, improve the energy efficiency of buildings, or can upgrade, repair, or protect existing infrastructures. Different and wide technological innovations are, therefore, quickly fostering advancements in the field of construction materials. A new generation of materials (bricks, cement, coatings, concrete, FRP, glass, masonry, mortars, nano-materials, PCM, polymers, steel, wood, etc.) is gaining a prominent position in modern building technology, since they can overcome various limits and flaws of conventional materials employed in constructions, without neglecting the smart applications of pioneering materials in ancient constructions and historic buildings. Even though the adoption of innovative materials in the construction field has been a successful route in achieving enhanced performance, or even new and unexpected characteristics, some issues have not been completely solved. On top of them, the cost/performance ratio of novel solutions, since their introduction must be convenient, without compromising quality. Other concerns are related to their sustainability, with eco-friendly options, possibly exploiting recycled materials or by-products from other productions, being the most desirable solution. Finally, the use of materials or systems that are unconventional in this field raises the need to update or develop new specifications and standards. This special issue aims at providing a platform for discussing open issues, challenges, and achievements related to innovative materials proposed for the construction industry.

Oxygen Analysis of Mixed Fluoride Salts Springer Nature

As product specifications become more demanding, manufacturers require steel with ever more specific functional properties. As a result, there has been a wealth of research on how those properties emerge during steelmaking. Fundamentals of metallurgy summarises this research and its implications for manufacturers. The first part of the book reviews the effects of processing on the properties of metals with a range of chapters on such phenomena as phase transformations, types of kinetic reaction, transport and interfacial phenomena. Authors discuss how these processes and the resulting properties of metals can be modelled and predicted. Part two discusses the implications of this research for improving steelmaking and steel properties. With its distinguished editor and international team of contributors, Fundamentals of metallurgy is an invaluable reference for steelmakers and manufacturers requiring high-performance steels in such areas as automotive and aerospace engineering. It will also be useful for those dealing with non-ferrous metals and alloys, material designers for functional materials, environmentalists and above all, high technology industries designing processes towards materials with tailored properties. Summarises key research and its implications for manufacturers Essential reading for steelmakers and manufacturers Written by leading experts from both industry and academia

Proceedings of IGC 2018 Woodhead Publishing

Waste and By-Products in Cement-Based Materials: Innovative Sustainable Materials for a Circular Economy covers various recycled materials, by-products and wastes that are suitable for the manufacture of materials within the spectrum of so-called cement-based materials (CBM). Sections cover wastes for replacement of aggregates in CBM, focus on the application of wastes for the replacement of clinker and mineral additions in the manufacture of binders, discuss the optimization process surrounding the manufacture of recycled concrete and mortars, multi-recycling, advanced radiological studies, optimization of self-compacting concrete, rheology properties, corrosion prevention, and more. Final sections includes a review of real-scale applications that have been made in recent years of cement-based materials in roads, railway superstructures, buildings and civil works, among others, as well as a proposal of new regulations to promote the use of waste in the manufacture of CBM. Favors the institution of the circular economy in the construction industry by eliminating the barriers that currently prevent industrial waste from being valorized by its inclusion in CBM design Features an in-depth exploration of the strengths and weaknesses of new raw materials and their application to CBMs Features real-scale applications that have been made in recent years of cement-based materials in roads, railway superstructures, buildings and civil works, among others Presents current, state-of-the-art, and future-prospects for the use of industrial waste in CBMs

Alkali-Activated Cements and Concretes Springer Science & Business Media

Concrete is the most used man-made material in the world since its invention. The widespread use of this material has led to continuous developments such as ultra-high strength concrete and self-compacting concrete. Recycled Aggregate in Concrete: Use of Industrial, Construction and Demolition Waste focuses on the recent development which the use of various types of recycled waste materials as aggregate in the production of various types of concrete. By drawing together information and data from various fields and sources, Recycled Aggregate in Concrete: Use of Industrial, Construction and Demolition Waste provides full coverage of this subject. Divided into two parts, a compilation of varied literature data related to the use of various types of industrial waste as aggregates in concrete is followed by a discussion of the use of construction and demolition waste as aggregate in concrete. The properties of the aggregates and their effect on various concrete properties are presented, and the quantitative procedure to estimate the properties of concrete containing construction and demolition waste as aggregates is explained. Current codes and practices developed in various countries to use construction and demolition waste as aggregates in concrete and issues related to the sustainability of cement and concrete production are also discussed. The comprehensive information presented in Recycled Aggregate in Concrete: Use of Industrial, Construction and Demolition Waste will be helpful to graduate students, researchers and concrete technologists. The collected data will also be an essential reference for practicing engineers who face problems concerning the use of these materials in concrete production.

Bio-Imaging WIT Press

The recovery of solid wastes for the preparation of innovative composite materials not only represents an economic advantage, but also offers an ecological opportunity for the utilization of by-products which would otherwise be landfilled. Specifically, the reuse and recycling of waste lead to important savings of raw materials and energy, since these by-products, generally deriv from agricultural or industrial activities, are abundant in nature. Moreover, a reduction of the environmental and related sanitary impacts can be also achieved. For this reason, a recycling operation is fundamental for the improvement of the environmental sustainability, because these secondary raw materials become a resource that can be easily reused without the modification of the peculiar characteristics, in order to obtain new and performing composites, with a low specific weight, high durability, and long life cycle.

Characteristics and Uses of Steel Slag in Building Construction Woodhead Publishing

The interaction of metal with its environment that results in its chemical alteration is called metallic corrosion. According to the literature, corrosion is classified to two types: uniform and localized corrosion. Intervention in either in the alloy environment or in the alloy structure can provide the corrosion protection of metallic materials. Furthermore, the interference in the metal alloy environment can be conducted with the utilization of cathodic or anodic protection via the corresponding inhibitors. Therefore, the most common categorization is cathodic, anodic, and mixed-type inhibitors, taking into account which half-reaction they suppress during corrosion phenomena. The majority of the organic inhibitors are of mixed type and perform through chemisorption. In order to update the field of the corrosion protection of metal and metal alloys with the use of organic inhibitors, a Special Issue entitled "Advances in Organic Corrosion Inhibitors and Protective Coatings" is introduced. This book gathers and reviews a collection of ten contributions (nine articles and one review), from authors from Europe, Asia, and Africa, that were accepted for publication in this Special Issue of Applied Sciences.

Novel Bioderived Composites from Wastes CRC Press

Concrete Solutions contains the contributions from some 30 countries to Concrete Solutions, the 6th International Conference on Concrete Repair (Thessaloniki, Greece, 20-23 June 2016). Strengthening and retrofitting are major themes in this volume, with NDT and electrochemical repair following closely, discussing the latest advances and technologies in concrete repair. The book brings together some interesting and challenging theoretical approaches and questions if we really understand and approach such topics as corrosion monitoring correctly. Concrete Solutions is an essential reference work for those working in the concrete repair field, from engineers to architects and from students to clients. The Concrete Solutions Series of international conferences on concrete repair began in 2003 with a conference held in St. Malo, France in association with INSA Rennes. Subsequent conferences have seen the Series partnering with the University of Padua (Italy) in 2009, with TU Dresden (Germany) in 2011 and with Queen's University Belfast (Northern Ireland) in 2014. In 2016 Thessaloniki (Greece) hosted the conference, partnering with both Aristotle University of Thessaloniki (AUTH) and Democritus University of Thrace (DUTH). The next conference in the series will be held in 2019 in Istanbul.

Processing and Characterization of Materials Springer Nature

This volume comprises select papers presented during the Indian Geotechnical Conference 2018, discussing issues and challenges relating to the characterization of geomaterials, modelling approaches, and geotechnical engineering education. With a combination of field studies, laboratory experiments and modelling approaches, the chapters in this volume address some of the most widely investigated geotechnical engineering topics. This volume will be of interest to researchers and practitioners alike.

Innovation in Electric Arc Furnaces CRC Press

New Trends in Eco-efficient and Recycled Concrete describes different recycled materials that have been used in eco-efficient concrete, reviewing previous publications to identify the most effective recycled materials to be applied in concrete manufacture. New trends on eco-efficient concrete are presented, filling a gap in the market. Sections cover various recycled materials applied in concrete production, present the latest on the lifecycle analysis of recycled aggregate concrete, detail new trends in recycled aggregate concrete research, and finally, present updates on upscaling the use of recycled aggregate concrete and structural reliability. Focuses on new trends in recycled aggregate concrete and its applications (rather than the more subjective 'sustainability' aspects) Contains very important contributions from researchers in eco-efficient concrete, including Chi Sun Poon, Jorge de Brito, Valeria Corinaldesi, Francisco Agrela, etc. Presents a 'one stop' reference for a graduate course on sustainable construction

Sustainability, Eco-efficiency, and Conservation in Transportation Infrastructure Asset Management Woodhead Publishing

Advances in Organic Corrosion Inhibitors and Protective CoatingsMDPI

Fundamentals, Processes, Applications Springer Nature

This research sets out to study the possibility and reliability of applying commercially available computational thermodynamic software to calculate comparable data to the instrumentally analyzed amounts of the elements in the molten steel and minerals in the tops slag during the clean steelmaking process. Vacuum treatment process in an ASEA-SKF ladle furnace was chosen for this study. The Thermo-Calc software package was applied in order to compute slag-steel equilibria conditions at the end of the argon degassing process. The slag, steel, temperature, and pressure that were measured by instrumental analysis at the steelmaking plant and were taken exactly before starting the argon degassing process was used as the input data for these thermodynamic calculations, and the simulated results of the Thermo-Calc were compared with the measured values of steel and slag compositions at the end of the degassing process. Regarding Al2O3, CaO, S, and SiO2 in the top slag and Al, Mn, and Si in molten steels, the measured results were in good agreement with the calculated results. Considering the calculated MgO content of the top slag and O, S, Ca, and Mg contents in the molten steel, the calculated results disagreed with the measured ones. Finally, a model was suggested that could be applied to calculate the closest results to the measured results of oxygen content in the molten steel. This study also highlighted the possibility of applying computational thermodynamics for predicting the appearance of dominant types of inclusions during steelmaking and solidifications.

Select Proceedings of ICCME 2020 Springer

This volume is the amalgamation of papers presented at International Conference on Processing and Characterization of Materials (ICPCM 2018) which was held in National Institute of Technology Rourkela, Odisha, India during 6th – 8th December 2018 and contains results of investigations in the fields of study properties of steel, alloys and composites, properties of materials for electronics, optoelectronics and for energy, nuclear, aviation and defense applications including materials processing and metal extraction technologies, microstructural characterization, materials surface modification, deposition of thin films and special coatings, corrosion, etc.

Advances in Construction Materials and Sustainable Environment CRC Press

This book includes selected conference proceedings of Conference on Processing and Characterization of Materials (CPCM-2020). The content of the book includes processing of and characterization of materials, sustainable energy materials, defense materials, functionally graded materials, and composites which has significant impact on cutting-edge applications. The book also includes surface engineering, computational methods and materials, waste utilization, and corrosion and environmental degradation of materials. Design, research, and development studies, experimental investigations, theoretical analysis, and fabrication techniques relevant to the application of materials in various assemblies, ranging from individual components to complete structure are presented in the book. The book is useful for graduate students, researchers, and industry professionals alike.

Theory and Applications in Metallurgy Springer Nature
The first English-language book which reviews and summarizes worldwide research advances in alkali-activated cements and concrete. Essential topics include: raw materials and their properties for the production of the two new types of binder the hydration and microstructure development of alkali-activated slag cements the mechanical properties and durability of alkali-activated slag cement and concrete other various cementing systems and their applications related standards and specifications. This respected team of authors has produced an important piece of research that will be of great interest to professionals and academics alike, enabling the production of more durable and environmentally sensitive materials.
Innovative Materials for Construction BoD – Books on Demand
This book is a definitive reference on the environmental geochemistry and resource potential of metallurgical slags
The Chemistry, Manufacture and Uses of the Oxides, Hydroxides and Carbonates of Calcium and Magnesium Springer
Additive manufacturing (AM) is one of the manufacturing processes that warrants the attention of industrialists, researchers and scientists, because of its ability to produce materials with a complex shape without theoretical restrictions and with added functionalities. There are several advantages to employing additive manufacturing as the primary additive manufacturing process. However, there exist several challenges that need to be addressed systematically. A couple such issues are alloy design and process development. Traditionally alloys designed for conventional cast/powder metallurgical processes were fabricated using advanced AM processes. This is the wrong approach considering that the alloys should be coined based on the process characteristics and meta-stable nature of the process. Hence, we must focus on alloy design and development for AM that suits the AM processes. The AM processes, however, improve almost every day, either in terms of processing capabilities or processing conditions. Hence, the processing part warrants a section that is devoted to these advancements and innovations. Accordingly, the present Special Issue (book) focuses on two aspects of alloy development and process innovations. Here, 45 articles are presented covering different AM processes including selective laser melting, electron beam melting, laser cladding, direct metal laser sintering, ultrasonic consolidation, wire arc additive manufacturing, and hybrid manufacturing. I believe that this Special Issue bears is vital to the field of AM and will be a valuable addition.
Springer Nature
This detailed handbook covers different chromatographic analysis techniques and chromatographic data for compounds found in air, water, and soil, and sludge. The new edition outlines developments relevant to environmental analysis, especially when using chromatographic mass spectrometric techniques. It addresses new issues, new lines of discussion, and new findings, and develops in greater detail the aspects related to chromatographic analysis in the environment. It also includes different analytical methodologies, addresses instrumental aspects, and outlines conclusions and perspectives for the future.
Waste Production and Utilization in the Metal Extraction Industry Purdue University Press
Steel slag is a by-product of steelmaking and refining processes. In 2006, 10-15 million metric ton of steel slag was generated in the U.S. Out of the total steel slag produced in the U.S. every year, about 50-70% is used as aggregate for road and pavement construction and approximately 15-40% is stockpiled in steel plants and eventually landfilled at slag disposal sites. Since current levels of steel slag stockpiling and landfilling are not sustainable, alternative geotechnical engineering applications for steel slag are being explored to alleviate the slag disposal problem and to help save dwindling natural resources. The main objectives of this research were to determine the geotechnical engineering properties of two types of steel slag generated from different steelmaking operations and to assess their potential use in subgrade stabilization and embankment construction. Samples of fresh and aged basic-oxygen-furnace (BOF) slag and of fresh electric-arc-furnace-ladle (EAF(L)) slag were characterized through a series of laboratory tests (specific gravity, grain-size analysis, X-ray diffraction, compaction, maximum and minimum density, large-scale direct shear, consolidated drained triaxial and swelling tests).